



Billing Code 4310-55-P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS-R9-ES-2009-0094]

[450 003 0115]

RIN 1018-AY64

Endangered and Threatened Wildlife and Plants; Listing the Honduran Emerald Hummingbird

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Proposed rule; 12-month finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), propose to list as endangered the Honduran emerald hummingbird (*Amazilia luciae*) under the Endangered Species Act of

1973, as amended (Act). This species is endemic to a small area in Honduras, and the population is estimated to be less than 1,000 and decreasing. Its suitable habitat has decreased in the past 100 years and continues to diminish. This document also serves as the completion of the status review (also known as the 12-month finding). We seek information from the public on the proposed listing for this species.

DATES: We will consider comments and information received or postmarked on or before [Insert date 60 days after date of publication in the **Federal Register**].

ADDRESSES: You may submit comments by one of the following methods:

- Federal eRulemaking Portal: *<http://www.regulations.gov>*. Follow the instructions for submitting comments on Docket No. **FWS-R9-ES-2009-0094**.
- U.S. mail or hand-delivery: Public Comments Processing, Attn: **FWS-R9-ES-2009-0094**, Division of Policy and Directives Management; U.S. Fish and Wildlife Service; 4401 N. Fairfax Drive, MS 2042-PDM; Arlington, VA 22203.

We will not accept comments by e-mail or fax. We will post all comments on *<http://www.regulations.gov>*. This generally means that we will post any personal information you provide us (see the **Information Requested** section below for more information).

FOR FURTHER INFORMATION CONTACT: Janine Van Norman, Chief, Branch of Foreign Species, Endangered Species Program, U.S. Fish and Wildlife Service, 4401 North Fairfax Drive, Room 420, Arlington, VA 22203; telephone 703-358-2171. If you use a telecommunications device for the deaf (TDD), call the Federal Information Relay Service

(FIRS) at 800-877-8339.

Background

Section 4(b)(3)(B) of the Endangered Species Act (ESA) (16 U.S.C. 1531 *et seq.*) requires that, for any petition to revise the Federal Lists of Endangered and Threatened Wildlife and Plants that contains substantial scientific or commercial information that listing the species may be warranted, we make a finding within 12 months of the date of receipt of the petition (“12-month finding”). In this finding, we determine whether the petitioned action is: (a) Not warranted, (b) warranted, or (c) warranted, but immediate proposal of a regulation implementing the petitioned action is precluded by other pending proposals to determine whether species are endangered or threatened, and expeditious progress is being made to add or remove qualified species from the Federal Lists of Endangered and Threatened Wildlife and Plants. Section 4(b)(3)(C) of the ESA requires that we treat a petition for which the requested action is found to be warranted but precluded as though resubmitted on the date of such finding, that is, requiring a subsequent finding to be made within 12 months. We must publish these 12-month findings in the **Federal Register**.

In this document, we announce that listing this species as endangered is warranted, and we are issuing a proposed rule to add this species as endangered to the Federal List of Endangered and Threatened Wildlife. Prior to issuing a final rule on this proposed action, we will take into consideration all comments and any additional information we receive. Such information may lead to a final rule that differs from this proposal. All comments and

recommendations, including names and addresses of commenters, will become part of the administrative record.

Petition History

On October 28, 2008, the Service received a petition dated October 28, 2008, from Mr. David Anderson of Louisiana State University on behalf of The Hummingbird Society of Sedona, Arizona; The Hummingbird Conservancy of Butte, Montana; Clos LaChance of San Martin, California; Honduran Environmental Network for Sustainable Development of La Ceiba, Honduras; Fundación Parque Nacional Pico Bonito of La Ceiba, Honduras; EcoLogic Development Fund of Cambridge, Massachusetts; and Crowell and Moring, LLP of the District of Columbia, requesting that we list the Honduran emerald hummingbird as endangered under the Act. The petition clearly identified itself as a petition and included the requisite identification information required at 50 CFR 424.14(a). In response to the petitioners' request, we sent a letter to Mr. Anderson dated December 5, 2008 acknowledging receipt of the petition. The petition also included a letter from the Honduras Ambassador, Roberto Flores Bermudez, to Secretary Salazar, dated January 23, 2009, in support of this petition. We also received subsequent letters supporting the petition to list this species from the Francis Lewis High School Key Club on February 12, 2009, the Lehman College Key Club on February 26, 2009, and the Ecologic Development Fund on April 8, 2009.

Previous Federal Actions

On June 23, 2010, we published a 90-day finding (75 FR 35746) on the petition announcing that we would initiate a status review to determine if listing this species is warranted. This proposed listing determination constitutes our 12-month finding on the petition to list this species as endangered.

Peer Review

We are seeking comments from independent species experts to ensure that our listing proposal is based on scientifically sound data, assumptions, and analyses. We have invited these peer reviewers to comment on our specific assumptions and conclusions in this listing proposal. Because we will consider all comments and information received during the comment period, our final determination may differ from this proposal.

Information Requested

We intend that any final actions resulting from this proposed rule will be based on the best scientific and commercial data available. Therefore, we request comments or information from the Government of Honduras, the scientific community, or any other interested parties concerning this proposed rule. We particularly seek clarifying information concerning:

(1) Information on the species' taxonomy, distribution, habitat selection (especially breeding and foraging habitats), diet, and population abundance and trends (especially current recruitment data) of this species.

(2) Information on the effects of habitat loss and changing land uses on the distribution and abundance of this species and its principal food sources over the short and long term.

(3) Information on whether changing climatic conditions (i.e., increasing intensity of hurricanes or drought) are affecting the species, its habitat, or its food sources.

(4) Information on the effects of other potential factors, including live capture and collection, domestic and international trade, predation by other animals, and diseases of this species or its principal food sources over the short and long term.

(5) Information on management programs for hummingbird conservation, including mitigation measures related to conservation programs, and any other private or governmental conservation programs that benefit this species.

(6) Genetics and taxonomy.

(7) The factors that are the basis for making a listing determination for a species under section 4(a) of the Act (16 U.S.C. 1531 *et seq.*), which are:

(a) The present or threatened destruction, modification, or curtailment of its habitat or range;

(b) Overutilization for commercial, recreational, scientific, or educational purposes;

(c) Disease or predation;

(d) The inadequacy of existing regulatory mechanisms; or

(e) Other natural or manmade factors affecting its continued existence.

Please include sufficient information with your submission (such as full references) to allow us to verify any scientific or commercial information you include. Submissions merely

stating support for or opposition to the action under consideration without providing supporting information, although noted, will not be considered in making a determination. Section 4(b)(1)(A) of the ESA directs that determinations as to whether any species is an endangered or threatened species must be made “solely on the basis of the best scientific and commercial data available.”

Public Hearing

At this time, we do not have a public hearing scheduled for this proposed rule. The main purpose of most public hearings is to obtain public testimony or comment. In most cases, it is sufficient to submit comments through the Federal eRulemaking Portal, described above in the **ADDRESSES** section. If you would like to request a public hearing for this proposed rule, you must submit your request, in writing, to the person listed in the **FOR FURTHER INFORMATION CONTACT** section by Insert date 45 days after date of publication in the Federal Register.

Species Information

Taxonomy

This species was first taxonomically described by Lawrence in 1867 and placed in the Trochilidae family as *Amazilia luciae* (UNEP-WCMC 2009a, p. 1). Common names for the species include Honduran emerald hummingbird, Ariane De Lucy (French), and colibrí

esmeralda Hondureña (Spanish). The Honduran emerald hummingbird is also known by the synonyms *Polyerata luciae* and *Thaumatias luciae* (Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)). BirdLife International (BLI) and CITES both recognize the species as *Amazilia luciae* (BLI 2008, p. 1). Therefore, we accept the species as *Amazilia luciae*, which also follows the Integrated Taxonomic Information System (ITIS 2009). ITIS is a database maintained by a partnership of U.S., Canadian, and Mexican federal government agencies, other organizations, and taxonomic specialists to provide taxonomic information.

Description

The Honduran emerald hummingbird is in the family *Trochilidae* (BLI 2008, p. 1; Sibley and Monroe 1993, 1990). The species is a medium-sized hummingbird with an average length of 9.5 centimeters (3.7 inches) (BLI 2008, p. 2). There are more than 325 hummingbird species and they exhibit a wide range of flight-related morphology and behavior, based on ecological factors (Altshuler and Dudley 2002, p. 2,325). As do all hummingbirds, the Honduran emerald hummingbird exhibits slight sexual dimorphism, which is demonstrated in the coloring of its plumage. The male has an iridescent blue-green throat and upper chest and occasionally has a grey mottled coloring. Its back is an emerald green color, the ventral (underneath) side of the bird is pale grey with mottled green sides, and the tail is bright green with a bronze hint on the upper tail coverts (BLI 2008, p. 1). The bill is black with a red mandible and dark tip, and has a slightly longer, more decurved (downward curving) bill than the closely related species *A. candida* (Monroe 1968, p. 182). The plumage of the female is less brilliant (BLI 2008, p. 2).

The tail of the female contains a grey tip, and the band of distinctive color on the throat of the female hummingbird is narrower, with pale edges (BLI 2008, p. 2; Monroe 1968, p. 183).

Juveniles have grayish throats spotted with turquoise (BLI 2008, p. 2).

Biology

Limited information is available on the Honduran emerald hummingbird's behavior and life history (Anderson 2010, p. 2). In 1988, a bird was observed defending a territory of 10 m² (108 ft²), suggesting that the species may be territorial (Collar et al. 1992, p. 493; Howell and Webb 1989, p. 643), as are many hummingbird species. This species has been observed feeding at heights between 0.5 to 10 m (2 to 32 ft) (Howell and Webb 1989, p. 643).

As with all hummingbird species, the Honduran emerald relies on nectar-producing flowers for food, but also relies on insects and spiders as sources of protein (BLI 2008, p. 3; Collar et al. 1992, p. 494). Hummingbirds are known to “disperse” rather than “migrate” in the sense that they do not follow routine, standard, round-trip movements; they follow sources of food availability (Berthold et al. 2003, pp. 40-41).

Population

Between 1988 and 1996 there was a notable decrease in reported occurrences of Honduran emerald hummingbirds (Portillo 2007, p. 48; Collar et al. 1992, p. 494; Stattersfield and Capper 2000, p. 311). In 1988, the species was known to be common in Olanchito and

Coyoles (BLI 2000, p. 311). In 1991, BirdLife International reported that between 22 and 28 individuals were found in 2.5 km² (618 ac) of habitat in Olanchito (See Figure 1 for a map of the region.). In 1996, the Honduran emerald hummingbird was found in less than 1 km² (247 ac) of habitat in the Agalta valley (Olancho Department), northeast of Gualaco (Stattersfield and Capper 2000, p. 311).

In 2007, the total population was estimated to be between 200 and 1,000 individuals (Anderson et al. 2007, p. 1). As of 2012, BLI estimated that the population is between 43 and 999 birds with a decreasing trend (citation p. 1). In the Yoro Department, several attempts have been made to conduct a census of the Honduran emerald hummingbird population. The best estimate by local biologists suggests that in the protected area the population is approximately 250 individuals (Perez and Thorn pers. comm. 2012).

Historic Distribution

The Honduran emerald hummingbird is the only known endemic bird species in Honduras (Anderson and Devenish 2009, p. 258; Portillo 2007, p. 17; Thorn et al. 2000, p. 3; Collar et al. 1992, p. 493; Monroe 1968, p. 182). Based on specimen data, the species (*Amazilia luciae*) was originally known to occur in four departments (which are similar to “States” in the United States): Cortés and Santa Barbara in the west and Yoro and Olancho in the northeast (see Figure 1). The historical locations where this species has been documented, along with the date it was documented, are below.

Catacamas, Olancho Department (1937 and 1991) (Howell and Webb 1992, pp. 46-47; Monroe 1968, p. 182).

Cofradía, Cortes Department (1933) (Monroe 1968, p. 182);

Coyoles, Yoro Department (1948 and 1950) (Monroe 1968, p. 182);

El Boquerón, Olancho Department (recorded September 1937) (Monroe 1968, p. 182);

Olanchito, Yoro Department (1988) (Howell and Webb 1989, pp. 642-643);

Santa Bárbara, Santa Bárbara Department (1935) (Monroe 1968, p. 182).

Between 1950 and 1988, there were no recorded observations of the Honduran emerald hummingbird. In 1988, the species was described as common in Olanchito and Coyoles, which are located 16 kilometers (km) (9 miles (mi)) apart (BLI 2008, p. 2). In 1991, between 22 and 28 individuals were found in a patch of habitat measuring 500 by 50 meters (m) (1,640 × 164 feet (ft)) near Olanchito (Howell and Webb 1992, pp. 46-47). In 1996, the bird was found in the Agalta Valley on less than 1 km² (247 acres (ac) or .39 mi²) of suitable habitat (BLI 2008, p. 3).

Current Distribution

Between 2007 and 2008, this species was detected in five valleys of Honduras (See Figure 1; Anderson 2010, p. 4). The Honduran emerald hummingbird has been rediscovered in western Honduras in two valleys in the Santa Barbara Department: the Quimistán Valley (in the Río Chamelecón watershed) and Tencoa Valley (Río Ulúa watershed), where it had not been recorded since 1935. Until its rediscovery, it was thought that habitat loss had restricted the species to isolated patches of arid thorn-forest and scrub of the interior valleys of northern

Honduras. In the Tenchoa Valley, researchers found individuals in five fragments, each separated by at least 5 km (3 mi). These fragments were between 5 and 60 ha (12 and 148 ac) each. We estimate that the population in the Santa Barbara Department is approximately 200 km (124 mi) west of the nearest known population in the Aguán Valley (Anderson 2010, p. 5). Searches in Cortés were unsuccessful at locating this species (Anderson 2008; Petition 2008). It is unclear if the western and eastern populations of this species are interbreeding (Anderson 2010, p. 5). BLI estimates that its range is 400 km² (154 mi²). However, local experts believe its actual extent of occurrence is closer to 150 km² (58 mi²) (Perez and Thorn pers. comm. 2012). Even with the rediscovery of the species in Santa Barbara and the extension of its range in Olancho, the species' habitat has been reduced (See Figure 1; Perez and Thorn pers. comm. 2012).

This species tends to be found generally along the same latitude. This phenomenon is not surprising; it is supported by research conducted by Tingley et al. in 2009, which found that 90.6 percent of bird species in this study tracked their Grinnellian niche (pp. 19,637, 19,640), which is a niche driven by factors such as climate, latitude, and elevation. The Honduran emerald hummingbird is found in habitat that appears to contain similar ecological conditions such as rainfall, humidity, types of species, and temperature. This hummingbird species is well known in the Aguán Valley, Yoro Department, in the areas of Olanchito and Coyoles, and is reported as relatively common, but only within its remaining native habitat (Gallardo 2010, p. 186; Thorn et al. 2000, pp. 22-23). Recently it was observed in San Esteban in the Agalta Valley and in the Telica Valley, both in the Olancho Department (Anderson and Hyman 2007, p. 6). However, aspects of this species' behavior are unclear, such as how far individuals disperse, what habitats are important for dispersal, and how the populations are linked genetically (Perez and Thorn

2012 pers. comm.; Anderson et al. 2010, p. 7).

Agalta Valley

The Agalta Valley is a remote region in the mountains of eastern Honduras containing over 1,000,000 hectares (2,471,054 ac) of land characterized as dry basin. Here, the Honduran emerald's habitat primarily is on large, privately owned cattle ranches that have restricted access (Anderson et al. 2010, p. 3). The species has been known to occur in this valley since the mid-1990s (Anderson et al. 1998, p. 181).

Aguán Valley

The Honduran emerald's habitat formerly encompassed a large extent of the Aguán Valley, a once pristine plain of nearly 4,662 km² (1,800 mi²). Ninety percent of its original habitat no longer exists in its original form due to the conversion of its habitat to banana plantations and cattle pasture. Much of the Honduran emerald species' habitat is on privately-owned land and is often planted with non-native grasses for cattle foraging (Perez and Thorn 2012, pers. comm.; Anderson pers. comm. 2008 in Petition 2008, p. 11). In some cases, it is even planted with invasive grass species (http://www.birdlist.org/cam/honduras/hn_ecosystems.htm, accessed May 22, 2012). Today, due to decades of unregulated and expanding cattle ranching, the hummingbird's dry forest range is limited to a few small, isolated islands of habitat. Its increasingly smaller ecosystems are surrounded by human-dominated landscapes. One estimate indicated that between 2,428 and

3,237 ha (6,000-8,000 acres) of suitable habitat remains in the Aguán Valley, most of which is privately owned (Gallardo 2010, p. 186); however, other estimates indicate that the species has even less suitable habitat available than the above estimate (Perez and Thorn 2012 pers. comm.). Efforts by Pico Bonito National Park Foundation (Fundación Parque Nacional Pico Bonito (FUPNAPIB) and others have succeeded in preserving important parts of the bird's habitat, however, even the area designated as protected is experiencing habitat degradation.

The Aguán River Valley is one of the last remaining areas that contains suitable and optimal habitat for the Honduran emerald hummingbird (Anderson and Hyman 2007, pp. 1-4). The lands along the Aguán River have periodically been devastated by banana diseases, floods, and hurricanes, particularly Hurricane Fifi in 1974 and Hurricane Mitch in 1998 (NOAA 2012, p. 2; Winograd 2006; USGS 2002, p. 5). This valley is on the south side of the Nombre de Dios mountain range, primarily in the Yoro Department (Gallardo 2010, p. 185). The Aguán River Watershed is 10,546 km² (4,072 mi² or 2,605,973 acres), is delimited by the tributaries of the Aguán River, and extends across the departments of Yoro, Colon, Atlántida, and Olancho (WWF 2008, p. 12, See Map 5, Map of Honduras, Aguán Valley at <http://www.regulations.gov>, docket no. **FWS-R9-ES-2009-0094**, Supporting Maps). This valley experiences a unique microclimate in which most of the rain falls between June to November (Gallardo 2010, p. 185). The land in the Aguán Valley is rich, fertile, and highly coveted, particularly in a country with a high poverty index that relies strongly on its land for agriculture (WWF 2008, p. 2).

In the last approximately 100 years, the Aguán region has experienced three periods of agricultural economic growth (WWF 2008, p. 11). Thorn forests were initially cleared in the

Aguán Valley to create banana and plantain plantations and rice farms, as well as pasture for cattle (Stattersfield and Capper 2000, p. 311). However, after an outbreak of Panama disease occurred in bananas, the Aguán Valley was largely abandoned, and much of the land reverted to pasture or forest. As a result of the agricultural reforms of the 1960's and 1970's, Honduran campesinos (farmers) received farmland in the Aguán Valley and proceeded to clear and develop the Valley that was previously forested into an agricultural region. In the late 1970s, lands were again cultivated with disease-resistant varieties of bananas. Now, only a single forest remnant larger than 100 ha (247 ac) that is suitable for this species is known to exist in this Valley (Anderson 2010, p. 6).

Western Honduras

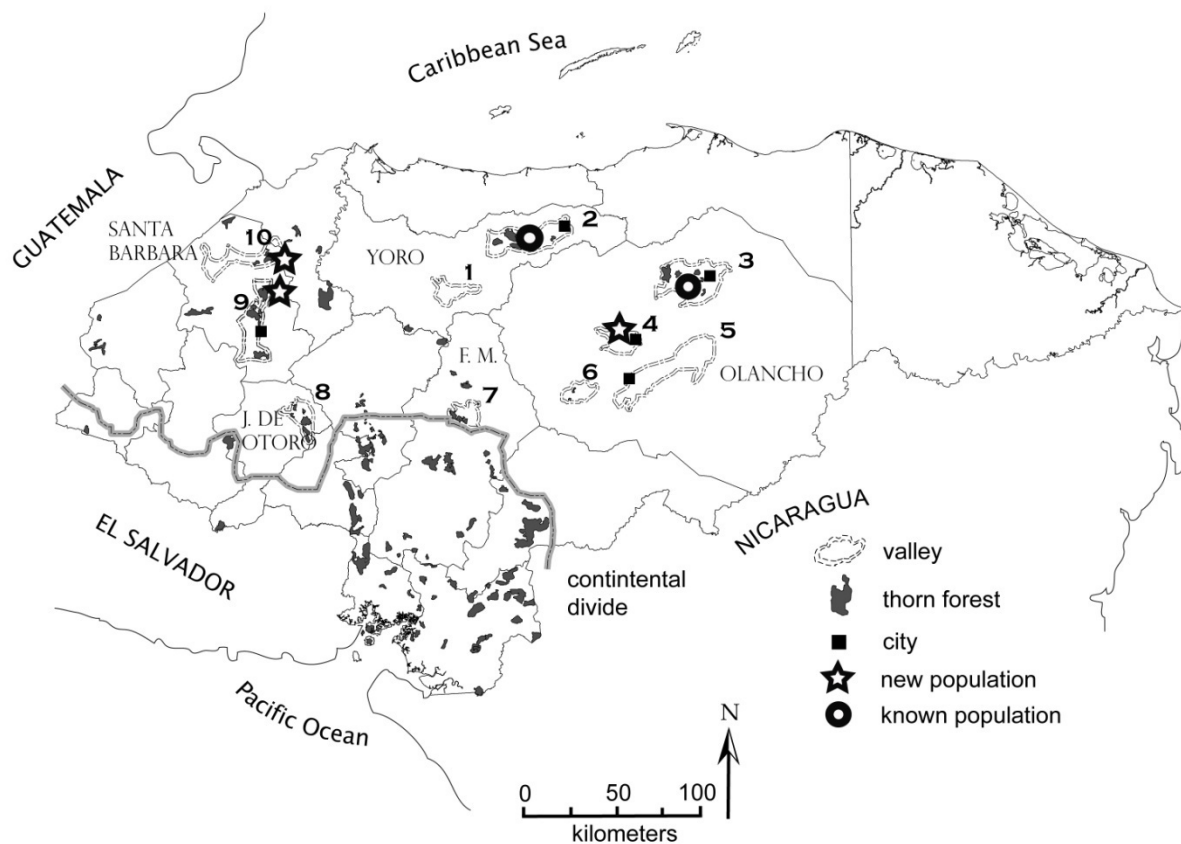
Sites occupied by the Honduran emerald in western Honduras are best described as semi-deciduous woodland, a habitat that has not previously been associated with the species. When hummingbirds do not find suitable available habitat, research indicates that they tend to abandon a territory and move to more productive patches (Feinsinger and Colwell 1978; Kodric-Brown and Brown 1978 in Justino et al 2012, p. 194). Canopy height in this area averages 15 m (49 ft), dominated by semi-deciduous broad-leaved tree species, principally *Eugenia oerstedia*, *Bursera simaruba*, and *Tabebuia rosea*, that form a relatively closed tree canopy. Common understory species are *Agave parvidentata*, *Tillandsia fasciculata*, *Bromelia pinguin*, *Bromelia plumieri*, and *Acanthocereus pentagonus* (Anderson 2010, p. 5).

The Honduran emerald hummingbird prefers arid interior valleys of thorn forest and shrub. The Aguán River Valley area rarely receives more than 76 cm (30 inches) of rain per year (Perez and Thorn 2012, pers. comm.; Gallardo 2010, www.birdsofhonduras.com). Due to the arid climate, many of the plant species are adapted to retain water and are succulents or contain spines as protection from herbivores. Many of the plants lose all their leaves in the dry season, and Honduran emerald habitat may appear almost lifeless. Typical plants within its habitat are cacti, acacias, and other succulents. In Honduras, this habitat occurs primarily along the gulf of Fonseca, in the Agalta Valley in the Olancho Department, and the Aguán Valley in the Yoro Department. Most of the hummingbird's occurrences have been noted at elevations below 410 m (1,345 ft); however, one occurrence was recorded at 1,220 m (4,003 ft) (BLI 2008, p. 3; et al. 1994, p. 119; Collar et al. 1992, p. 494).

In the Coyoles area in the Aguán Valley, the thorn forest is primarily comprised of Mimosaceae (herbaceous and woody species), Cactaceae (cactus species), and Euphorbiaceae (herbs, shrubs, trees, and some succulent species) (Collar et al. 1992, p. 494). Thorn et al. (2000, p. 23) observed that habitat with abundant flowers, red in particular, appear to be a critical characteristic for suitable habitat. A list of plant species associated with Honduran emerald hummingbird habitat is below, as well as a key that indicates whether the plant is (1) commonly found in its habitat, (2) associated with feeding or nesting, (3) a cactus or orchid species, and (4) found in Western Honduras (Anderson 2010, p. 5; Anderson 2009, p. 235; House 2004, pp. 14-16; Thorn et al. 2000).

In Yoro (see Figure 1), the Honduran emerald hummingbird visited the species *Pedilanthus camporum*, which produces flowers year-round, and *Nopalea hondurensis*, which flowers generally between February and April, 90 percent of the time observed. In western Honduras, 90 percent of foraging observations were on *Aphelandra scabra* and *Helicteres guazaumifolia*.

Figure 1. Honduran emerald habitat. Anderson 2010.



Plant species associated with Honduran Emerald Hummingbird Habitat.

Key

☐ = Feeding (or nesting)

+ = Common tree in its habitat

* = arborescent (tree-like) cactus

^ = Orchid

~ = Western Honduras

- *Acacia deami* + (no common name [NCN], in the family *Fabaceae*)
- *Acanthocereus pentagonus* ~ (Synonym = *Acanthocereus tetragonus*, barbed wire cactus, sword cactus, sword pear, sword-pear, triangle cactus)
- *Achatocarpus nigricans* + (NCN, in the *Achatocarpaceae* family)
- *Achmea bracteata* ☐ (NCN, in the *Bromeliaceae* family)
- *Agave parvidentata* ~ (NCN, in the *Asparagaceae* family)
- *Aphelandra deppeana* ☐ (NCN, in the *Acanthaceae* family)
- *Aphelandra scabra* +, ~ (NCN, in the family *Acanthaceae*),
- *Bromelia pinguin* ~, (wild pineapple, wild pine, Pinguin, bayonette)
- *Bromelia plumieri* ☐, ~ (NCN, in the *Bromeliaceae* family),
- *Bursera simaruba* ~ (gumbo-limbo and Copperwood),
- *Caesalpinia yucatanensis* + (thorny shrub or low tree, in the family *Fabaceae*)
- *Chloroleucon mánense* + (palo pinto, palo fierro, palo ébana)
- *Coccoloba acapulcensis* + (NCN, in the family *Polygonaceae*)

- *Combretum fruticosum* (NCN, vine, in the family *Combretaceae*)
- *Combretum fruticosum* □ (Orange Flame Vine, in the *Combretaceae* family)
- *Encyclia nematocaulon* ^ (thread-stemmed encyclia, in the *Orchidaceae* family)
- *Eugenia oerstediana* ~ (Guayabita, Sequarra, Sequara, in the *Myrtaceae* family)
- *Guaiacum sanctum* + (lignum vitae, in the family *Zygophyllaceae*)
- *Haematoxylon brasiletto* (Brazil wood or palo de brasil, in the family *Fabaceae* or *Leguminosae*)
- *Helicteres gauzaumifolia* □, ~ (NCN, in the family *Sterculiaceae*)
- *Laelia rubescens* ^ (rosy tinted laelia, guarita, in the family *Orchidaceae*)
- *Leucaena lempirana* + (thorny shrub or low tree, in the *Fabaceae* family)
- *Malpighia glabra* + (Acerola, Antilles cherry, Barbados cherry, cereso, cerezo, escobillo, health tree, huesito, Puerto Rican cherry, West Indian cherry, in the family *Malpighiaceae* synonym *Malpighia emarginata*)
- *Melocactus curvispinus* □ (NCN, in the *Cactaceae* family)
- *Myrmecophila wendlandii* ^ (NCN, in the *Orchidaceae* family)
- *Nopalea hondurensis* □, ~ (paddle cactus, in the family *Cactaceae*)
- *Opuntia hondurensis* * ~ (NCN, in the family *Cactaceae*)
- *Pedilanthus camporum* □, ~ (NCN, in the *Euphorbiaceae* family)
- *Pedilanthus cf. tithymaloides* □ (NCN, in the *Euphorbiaceae* family)
- *Pilosocereus leucocephalus* □ (NCN, in the *Cactaceae* family)
- *Pilosocereus maxonii* * (NCN, in the family *Cactaceae*)
- *Pithecellobium lentiscifolium* □ (NCN, *Leguminosae-caesalpinioideae* family)

- *Psittacanthus rhyncanthus* ☐ (hemiparasitic mistletoe, grows on canopy trees; in the *Loranthaceae* family)
- *Randia cookii* ☐ (NCN, in the family *Rubiaceae*)
- *Stenocereus thurberi* ☐ (syn *Lemaireocereus thurberi*, organ pipe cactus)
- *Stenocereus yunckeri* ☐, * (NCN, in the *Cactaceae* family),
- *Tabebuia rosea* ~ (pink poui, Poirier, Roble de Sabana – Costa Rica, in the family *Bignoniaceae*)
- *Tillandsia bracycaulus* ☐ (NCN, in the *Bromeliaceae* family)
- *Tillandsia fasciculata* ☐, ~ (NCN, in the *Bromeliaceae* family).

Three species of arborescent (tree-like) cacti have been associated with the Honduran emerald habitat: *Pilosocereus maxoni*, *Stenocereus yunckeri* (endemic), and *Opuntia hondurensis* (endemic) (House 2004, p. 15). The trees and shrubs found in one study of its habitat were almost 100 percent deciduous (House 2004, p. 15). Although epiphytes are usually rare in this habitat type, some epiphytes are well adapted to the extremes of this environment. Large clusters of three species of orchids: *Myrmecophila wendlandii*, *Laelia rubescens*, and *Encyclia nematocaulon* were found on some cacti (House 2004, p. 16). In larger, more mature trees, some bromeliads were found. The flowering of *Opuntia hondurensis* coincides with the nesting period of the Honduran emerald (House 2004, p. 23).

Conservation Status

The Honduran emerald hummingbird is listed as endangered by the IUCN (2012). This species was downlisted to endangered from critically endangered following its recent discovery in the western part of Honduras, which increased its known range (BLI 2012, pp. 1-2). Its IUCN classification is based on its very small and severely fragmented range and population. However, this status under IUCN conveys no actual protections to the species. The Honduran emerald hummingbird has been listed in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since October 22, 1987, at which time all hummingbird species not previously listed in the Appendices were listed in Appendix II. CITES controls international trade in animal and plant species affected by trade. Appendix II includes species that are not necessarily threatened with extinction, but may become so unless trade is subject to strict regulation to avoid utilization incompatible with the species' survival.

International trade in specimens of Appendix II species is authorized through a system of permits or certificates under certain circumstances. CITES, of which Honduras is a Party, is an international agreement through which member countries, called Parties, work together to ensure that the international trade in CITES-listed animals and plants is not detrimental to the survival of wild populations by regulating their import, export, and reexport. This process includes verification that (1) trade will not be detrimental to the survival of the species in the wild, and (2) that the material was legally acquired (www.cites.org).

Factors Affecting the Species

Introduction

The factors affecting the Honduran emerald hummingbird's habitat are interrelated. A species may be affected by more than one factor acting in combination with other factors. In some cases, it is not necessarily easy to determine which factor is negatively affecting a species. The most obvious factor that affects this species is a significant loss of habitat (90 percent) over the past approximately 100 years due to land conversion to plantations, agriculture, and cattle pastures (Perez and Thorn 2012, pers. comm.). This loss of habitat interacts with other factors in affecting the Honduran emerald hummingbird's habitat, and these factors are discussed in detail below.

Habitat Loss

The country has been steadily losing thorn forest cover, particularly since the early 1960s, often due to the conversion of thorn forest areas to cattle pastures and plantation agriculture such as banana and oil palm plantations (World Wildlife Fund [WWF] 2008, p. 11; Anderson pers. comm. 2008 in Petition 2008, p. 11; Portillo 2007, p. 75). In the Aguán Valley, as of 2000, this species' suitable habitat had reduced in size to an estimated 8,495 hectares (ha) (20,092 ac) from 16,000 ha (39,537 ac) in 1977 and 30,000 ha (74,132 ac) in 1938 (See Table 1; Thorn et al. 2000, p. 25).

The carrying capacity of suitable habitat that remains for this species is unknown. In other words, it is unclear how many hummingbirds the remaining suitable habitat can maintain. Nectar is the primary source of carbohydrates for hummingbirds, and pollen is the primary source of protein for hummingbirds (Araújo et al. 2011, p. 827; Hegland et al. 2009, p. 188). Although studies of nutritional requirements have been conducted with respect to other hummingbird species, the home range required to support the breeding, feeding, and nesting requirements for each pair of Honduran emerald hummingbirds is unclear.

In 2000, a survey was conducted for the Honduran emerald hummingbird which found that it occurs in dry tropical forest (Anderson and Hyman 2007, pp. 1-4; Thorn et al. 2000, pp. 1-5). However, the species has recently been discovered in Western Honduras in an area with different ecological characteristics (see habitat description above), where it had not been recorded since 1935 (Anderson et al. 2010, p. 1). It is unclear whether this species is moving westward in reaction to loss of habitat in eastern Honduras; some species of hummingbirds will make these types of moves in search of new habitat (Justino et al 2012, pp. 194-195).

Conversion of this species' habitat to coffee, bean, and corn plantations has occurred in many areas, particularly in the Santa Barbara Department (See Figure 1; Perez and Thorn 2012, pers. comm.). In the Aguán Valley, 10,319 ha (25,500 acres) now consist of banana plantations in an area known as the Barisma farm (Dole 2011, p. 67). Habitat suitable for Honduran emerald hummingbirds continues to be cleared by private landowners in order to plant pasture grass for grazing cattle (Hyman 2012 pers. comm.). In the Yoro Department, there are only four large patches of suitable habitat for this species remaining (Perez and Thorn 2012, pers. comm.; Anderson 2010.). The four largest fragments are between 360 and 476 ha (890 and 1,176 ac), for a combined total of 1,704 ha (Anderson 2010, p. 6).

Several hummingbird species have persisted in fragmented tropical landscapes (Stouffer & Bierregaard 1995 in Hadley and Betts 2009, p. 207). However, hummingbird persistence at the landscape scale does not indicate that the population is at the same level it was prior to deforestation (Hadley and Betts 2009, p. 207). Flight paths used by another hummingbird species to travel between suitable habitats indicate that gaps in suitable habitat alter hummingbird movement pathways (Hadley and Betts 2009, p. 209). In agricultural landscapes, hummingbirds were observed traveling longer distances and took more circuitous routes than in forested landscapes. Overall, movement paths were strongly linked with areas that contained higher forest cover (2009, p. 209). The flight of hummingbirds is one of the most energetically demanding forms of animal locomotion (Buermann et al. 2011, p. 1671). Due to habitat loss, Honduran emerald hummingbirds expend more energy to travel between and find suitable habitat that provides substrates for breeding, feeding, and nesting.

Palm Oil Production

Palm oil plantations in the Aguán River Basin have replaced pasture lands that were left behind after the banana plantations diminished from their initial success during the first part of the twentieth century (WWF 2008, p. 30). The palm oil production in the Aguán River Basin is concentrated between Sava and Tumbaderos (WWF 2008, p. 17, see Figure 1) and covers 28,082 ha (69,392 ac). The area includes plantations, processing plants, nurseries, palm oil collecting sites, and other infrastructure. Honduras' palm oil industry exported product worth over \$21 million U.S. dollars in 2004, and Honduras is expected to increase its biofuels production (Silvestri 2008, p. iii). Other countries are encouraging Honduras to increase production of palm oil which would likely affect the Aguán River Basin (Silvestri 2008, pp. 47; WWF 2008, pp. 37-38). These changes in land use, from production of bananas to pastures, and then to palm oil plantations, have had an environmental cost (WWF 2008, pp. 30, 53-54) such as land degradation through deforestation and exposure to fertilizers and pesticides, which are discussed below.

To provide perspective on the magnitude of the production in this valley, the Aguán Valley Palm Producers Association (APROVA) is a cooperative of 154 oil palm farmers (USDA 2012, pp. 1-3). In 2009, APROVA opened its first palm oil processing plant, which processes up to five tons of palm oil per day (USDA 2012, pp. 1-3); there are now five processing plants. As of 1938, within the Aguán Valley 30,000 ha (74,131 ac) were tropical dry forest (Tierra America 2012, pp. 1-2). By 1977, suitable habitat for the Honduran emerald hummingbird had been

reduced to 16,000 ha (39,537 ac), and in 2000, only 8,495 ha (20,991 ac) remained. Of that area, only 3,900 hectares (9,637 ac) can be considered well preserved enough to sustain significant populations of the Honduran emerald (Mejía pers. comm. in Tierra America 2012).

Table 1. Land reduction in the Aguán Valley.

Aguán Valley	Year	Hectares	Acres
Tropical Dry Forest	1938	30,000	74,131
Tropical Dry Forest	1977	16,000	39,537
Tropical Dry Forest	2000	8,495	20,991

Source: Thorn et al 2000.

Land Ownership

Because very little of this species' habitat is publicly owned, it is more difficult to provide protections to this species (approximately 84 percent of its suitable habitat is privately owned) (Steiner 2012 pers. comm.; FAO 2010, p. 238). In many cases, the only sites in Honduras that have maintained a viable ecosystem in somewhat of a natural state are places with irregular topography. Subsequently, these have become protected areas or private nature reserves (Portillo 2007, p. 75). Much of this species' original habitat, thorn forest, has been cleared for housing, towns, agriculture, and cattle grazing (Stattersfield and Capper 2000, p. 311; Thorn et al. 2000, p. 4). This species' remaining habitat in the Aguán Valley (Yoro Department) and Agalta Valley (Olancho Department) is primarily privately owned as large *haciendas* (plantations or farms), where cattle grazing, clearing for cattle, and plantation agriculture

continues to occur (Stattersfield and Capper 2000, p. 311). In the lower river valley, agricultural cooperatives are raising citrus fruits, corn (maize), rice, and African palm for oil (WWF 2008, p. 12). Because most of this species' habitat is unprotected, the species is likely to continue to experience habitat degradation through conversion of its habitat to other uses such as cattle grazing and agricultural plantations.

Pesticides and Fertilizers

WWF notes that production yield level can only be increased with the use of agrochemicals such as fertilizer and more pesticides, which in turn all have an environmental impact. Before palm oil tree canopies are developed and sunlight is penetrating the ground, weeds are aggressive and frequent weed control is needed. Mechanical weed mowers hauled by agricultural tractors are used to keep weeds at a manageable height in between rows. Before the canopy is fully developed, areas around young plants are kept free of competing weeds mostly by chemical herbicides and by manually removing them (WWF 2008). Currently, these plantations are approximately 161 km (100 miles) north of the Honduran emerald hummingbird habitat, and are not known to directly affect this species (Hyman 2012, pers. comm.). However, it is likely that expansion of palm oil plantations in the Aguán River Basin will occur (Silvestri 2008, p. 48). Additionally, the significant amount of inputs, such as fertilizers and pesticides required by palm oil plantations, produce chemical residues that are discarded in several ways. All of these waste products have different fates, depending on their chemical and physical origin (WWF 2008, unpaginated), affecting Honduran emerald hummingbird habitat in various ways.

Roads

There are plans to pave the road between Olanchito and San Lorenzo, an approximately 46-km [28.6-mi] stretch that currently passes through the Aguán Valley which will further impact this species' habitat (Hyman 2012; pers. comm.; World Bank 2011, pp. 1-3; Hyman 2007, p. 10; Anderson pers. comm. 2008 in Petition 2008). Honduras is ranked among the countries with the lowest development of road networks in Central America (Acevedo et al. 2008, p. 1). The agricultural sector is the most important of the Honduran economy (Acevedo et al. 2008, p. 1); however, this sector is limited by difficulties of transportation and access to many of the productive areas of the country due to poor road infrastructure (Quintero et al., 2007, pp. 15-18; Winograd 2006).

Existing roads have been negatively impacted by hurricanes, flooding, and neglect after the crash of the banana industry. The Aguán and Agalta valleys, which contain this species' preferred habitat, are some of the most productive agricultural areas of the country, and this change in land use has decreased the available suitable habitat for the Honduran emerald hummingbird (Acevedo et al. 2008, p. 1). These agricultural areas of the country are in the departments of Atlantida (Aguán Valley) and Olancho (Agalta and Guayape valleys) and include bananas, coffee, palm oil, corn, beans, edible vegetables, fruits, and other crops. The improvement and development of roads to transport agricultural products to economic hubs is being considered by the Government of Honduras, which may affect the Honduran emerald hummingbird's habitat.

Growth in this economic sector is impeded by the lack of access to the most productive agricultural areas of the country due to poor road infrastructure. The road improvement project (Central Road, Route no. 23) is funded by the World Bank "Second Reconstruction and Improvement Project Road," (World Bank 2011, pp. 1-3; Proceso Digital 2010). The road improvement project will likely bring more traffic, which will increase land speculation and settlement of homes along the road, ultimately impacting surrounding Honduran emerald habitat (Perez and Thorn 2012, pers. comm.; Steiner and Coto 2011). Roads through prime Honduran emerald habitat, which is presently being affected by cultivation of bananas and plantains, link the river valley to the ports at Tela, La Ceiba, Trujillo, and Puerto Cortés,.

This road construction project to widen the main highway between Olanchito and Yoro, spanning 57 km (35 mi) has been in the planning stages for several years. A project has been contingent on several factors, such as a loan from the World Bank and implementation of measures to mitigate the impact on the environment. A 2007 World Bank report indicated that during the project planning stage, the scope of the project changed so that the road segment passing through vital habitat for the Honduran emerald hummingbird was not implemented (Quintero 2007). In this report, the World Bank indicated that a Payments for Environmental Services plan, if successfully implemented, could lead to the long-term protection of an additional 1,000–2,000 hectares (2,474 – 4,942 ac) of Honduran emerald habitat on private lands. This, in turn, would address environmental concerns associated with the proposed paving of the Olanchito-San Lorenzo road (Quintero et al. 2007, p. 15). However, the status of this road project remains unclear.

The Agalta Valley is traversed by a highway that has been proposed to be repaved (Hyman 2012, pers. comm.; Inter American Development Bank 2012). This region is an area with a high rate of poverty — this highway is, in part, intended to improve the economic conditions in this region. This region contains approximately 50,000 human inhabitants. The highway will complete the second paved transit route between the Pacific and Atlantic oceans in Honduras. The road is being improved in order to provide a better link between Tegucigalpa and the Atlantic coast of Honduras and will better connect the Departments of Francisco Morazán, Olancho, and Colón. It is unclear how this highway will affect the remaining 5,000 hectares (12,355 ac) of this species' habitat (Bonta 2011, pers. comm.) in this valley.

Although this species exists in the Agalta Valley, very little information regarding the factors affecting this species in this area are known. Reports indicate that areas that contain suitable habitat characteristics for the Honduran emerald hummingbird are being cleared for rice cultivation (Hyman 2012, pers. comm.; Bonta 2011, pers. comm.). Several of the remaining habitat patches are connected by narrow corridors of habitat along property lines and waterways, but most of the patches of remaining habitat are “islands” within cattle pasture, which comprises approximately 90 percent of the Valley's area (Bonta 2011, pers. comm.). It is unclear whether the species migrates between the Agalta and Aguán valleys.

Hydroelectric and Development Projects

The construction of several development projects could possibly affect this species' habitat (Bonta 2012, pers. comm.) in the Agalta Valley. At least two hydroelectric projects have

become operational in recent years (Bonta 2012, pers. comm.). These projects could likely result in more infrastructure development in the Valley which could also affect the Honduran emerald habitat. Additionally, several agricultural development projects may be underway in the Agalta Valley (Bonta 2012, pers. comm.). Bonta indicates that the following projects, which can be located at <http://www.hondurasopenforbusiness.com>, are likely to affect the Honduran emerald habitat.

- AGR112: Production of Transgenic Certified Maize,
- AGR126: Cultivation of Piñón, *Jatropha curcas*, for biodiesel (5,000 hectares in the Agalta Valley),
- AGR401: Cultivation of Piñón (5,000 hectares in the Agalta Valley),
- AGR402: Cultivation of Piñón,
- FOR204: Teak (*Tectona grandis*) plantation: 20,000 hectares in three valleys; estimate of 4,000 to 8,000 hectares in the Agalta Valley.

Although highway construction, agricultural development, and resulting infrastructure is likely to occur in the Agalta Valley, it is unclear how these activities would negatively affect the Honduran emerald hummingbird in this valley.

International Trade

Data obtained from the United Nations Environment Programme–World Conservation Monitoring Center (UNEP-WCMC) show that, since its listing in CITES Appendix II in 1987, only two Honduran emerald hummingbird specimens have been recorded in international trade,

involving two bodies of unknown origin from Germany to the United States in 1996 (UNEP–WCMC 2009b). Therefore, international trade is not a factor influencing the species’ status in the wild. Nor are we aware of any other information that indicates that collection or overutilization of the Honduran emerald hummingbird is affecting this species.

Disease and Predation

The Intergovernmental Panel on Climate Change (2007, p. 51) suggests that the distribution of some disease vectors may change as a result of climate change. However, after conducting a status review of the Honduran emerald hummingbird and consulting with experts, we have no information at this time to suggest that any specific diseases are or may become problematic to this species.

Small and Declining Population

The population of the Honduran emerald hummingbird is small and very likely declining (BLI 2012, pp. 1-2; Stattersfield and Capper 2000, p. 311). In 2007, the information available indicated that this species had experienced a population decline since the 1960s and consisted of fewer than 2,000 individuals distributed within two, and possibly a third, valleys (BLI 2008, p. 2; Anderson and Hyman 2007, p. 6). In 2012, BLI stated that the population estimate was between 250 and 999 birds, within an estimated area of occupancy (AOO) of 12 km² (4.6 mi²) within an overall range of 400 km² (154 mi²). However, local experts believe its actual extent of occurrence is even smaller -- closer to 150 km² (58 mi²) (Perez and Thorn pers. comm. 2012).

Species often tend to have a higher risk of extinction if they occupy a small geographic range, occur at low density, occupy a high trophic level (position in food chain), and exhibit low reproductive rates (Purvis et al. 2000, p. 1949). Small populations can be more affected by factors such as demographic stochasticity (variability in population growth rates arising from random differences among individuals in survival and reproduction within a season), local catastrophes, and inbreeding (Pimm et al. 1988, pp. 757, 773-775). A small, declining population makes the species vulnerable to genetic stochasticity (random changes in the genetic composition of a population) due to inbreeding depression and genetic drift (random changes in gene frequency). This, in turn, compromises a species' ability to adapt genetically to changing environments (Frankham 1996, p. 1,507) reduces fitness, and increases extinction risk (Reed and Frankham 2003, pp. 233-234). Alternatively, species can adapt to changes in their environment and expand their range (Pateman 2012, pp. 1,028-1,030), although this does not appear to be the case with the Honduran emerald hummingbird.

The range and abundance of the hummingbird has been significantly curtailed. Because the Honduran emerald hummingbird is currently found in only three valleys, and has undergone a restriction in range and a decline in population size, any threats to the species, alone or in combination, are further magnified. In order for a population to sustain itself, there must be enough reproducing individuals and habitat to ensure its survival. Limited-range species are susceptible to extirpation, particularly when a species' remaining population is already small or its distribution is too fragmented. In addition, while this hummingbird may be either tolerant of fragmented thorn forests or appear to be tolerant of fragmented thorn forests, these fragmented

areas likely do not represent optimal conditions for the species. The fragmentation of the habitat and increased distance between suitable patches of habitat causes the species to expend more energy and resources in search of its nutritional requirements (Justino et al. 2012, pp. 194-195; Hadley and Betts 2009, p. 207). When habitat is degraded, there is often a time lag between the initial conversion or degradation of suitable habitats and the extinction of endemic bird populations (Brooks et al. 1999a, p. 1; Brooks et al. 1999b, p. 1140). Individuals of species may be more visible or appear to be more numerous when their habitat has disappeared; when in fact their population is decreasing because they have fewer resources or are expending more energy to reach the resources they need to survive. Remaining fragments of forested habitat will likely undergo further degradation due to their altered ecological dynamics and isolation (through infestation of gap-opportunistic species such as bamboo, which alter forest structure and cause a decrease in gene flow between populations) (Tabanez and Viana 2000, pp. 929-932).

The combined effects of habitat fragmentation and other factors on a species' population can act synergistically (Gilpin and Soulé 1986, p. 31). For example, an increase in habitat fragmentation can separate populations to the point where individuals can no longer disperse and breed among habitat patches, causing a shift in the demographic characteristics of a population and a reduction in genetic fitness (Gilpin and Soulé 1986, p. 31). This is especially applicable for a species such as the Honduran emerald hummingbird that was once more widespread; it has lost a significant amount (90 percent) of its historical range due to habitat loss and degradation.

Extreme Weather Events

Small, declining populations can also be especially vulnerable to environmental disturbances such as flooding, drought, or hurricanes (O’Grady 2004, pp. 513–514). The Honduran emerald hummingbird relies on specific habitat to provide for its breeding, feeding, and nesting. In 2012, Honduras was determined to be one of the countries most affected by climate change due to its geographic location which is in the direct path of many tropical storms and hurricanes (Harmeling 2012, pp. 5-6). Research and modeling have explored how changes in climate might affect areas such as Honduras (Gasner et al. 2010, p. 1250, Winograd 2002, p. 11). The term “climate change” refers to a change in the mean, variability, or seasonality of climate variables over time periods of decades or hundreds of years (Intergovernmental Panel on Climate Change (IPCC) 2007, p. 78). Forecasts of the rate and consequences of future climate change are based on the results of extensive modeling efforts conducted by scientists around the world (Solman 2011, p. 20; Laurance and Useche 2009, p. 1,432; Nuñez *et al.* 2008, p. 1; Margeno 2008, p. 1; Meehl *et al.* 2007, p. 753).

Climate change models, like all other scientific models, produce projections that have some uncertainty because of the assumptions used, the data available, and the specific model features. The science supporting climate model projections as well as models assessing their impacts on species and habitats will continue to be refined as more information becomes available. While projections from regional climate model simulations are informative, various methods to downscale projections to more localized areas in which the species lives are still imperfect and under development (Solman 2011, p. 20; Nuñez *et al.* 2008, p. 1; Marengo 2008, p. 1).

Honduras appears to have entered a more active period of hurricane activity (Pielke et al. 2003, p. 102). Studies of natural events in the last 100 years indicate that Honduras is highly vulnerable to an increase in frequency and intensity in the future not only hurricanes, but also landslides, flooding, and drought (Şekercioğlu et al. 2011; Gasner et al. 2010, p. 1250; Winograd 2006, p. 1). Due to its location and the biophysical traits of the region, Honduras is likely to be affected every 3 to 4 years by climate-related events, such as drought-related fires, floods, and landslides (Winograd 2006, p. 1). Winograd notes that 50 percent of Honduras is at risk of landslides, 30 percent is at risk of severe droughts, and 25 percent is at risk of flooding, particularly agricultural areas.

Arid-zone species are assumed to be more resilient to high temperatures and low humidity (Şekercioğlu et al. 2012, p. 5). However, species such as the Honduran emerald hummingbird are exposed to very dry conditions and are likely dependent on seasonal rains, as well as seasonal and permanent waterholes and rivers (Schneider and Griesser 2009 in Şekercioğlu et al. 2011, p. 5). Even small temperature increases can greatly increase the amount of birds' evaporative water loss (Şekercioğlu et al. 2011, p. 5). Warmer weather due to climate change is expected to impact the ability of birds in arid regions to sustain their water balance.

Climate models are not always able to predict the possible effects of ecological interactions, adaptation, or how species, particularly pollinators, might disperse in response to climate change (Buermann et al. 2011, p. 1671; Burkle and Alarcón 2011, p. 528; Pearson and Dawson 2003, p. 361). Honduras is clearly in the path of hurricanes (Winograd 2006, 2002; Pielke et al. 2003, pp. 101-103). However, additional research is still needed to determine how

changes in climate may affect species such as the Honduran emerald hummingbird (Hegland et al. 2009, p. 184).

Conservation Measures in Place

Several mechanisms are in place that are intended to provide protections to this species. These protections include involvement by nongovernmental organizations (NGOs), wildlife protection laws, and a reserve designated to protect its habitat. These mechanisms are described below.

Laws and Regulatory Mechanisms

Honduras has made significant progress in conservation of its natural resources (Portillo 2007, p. 60; Vreugdenhil et al. 2002, pp. 6, 11, 20-25). In the past 30 years, protected areas have increased from less than 20 protected areas to an estimated 600 areas with protected status (Portillo 2007, p. 60). Significant progress was made particularly between 1974 and 1987; meetings with regional authorities were held regarding protected areas in order to promote the conservation of the natural and cultural heritage of Honduras (Portillo 2007, p. 60). In 2003, the First Mesoamerican Congress on Protected Areas was held in Managua. The System of Protected Areas is managed by various entities such as NGOs, associations of municipalities or local authorities, or by management agreements. However, in some cases, these protected areas are not being managed effectively, as described below (Portillo 2007, p. 63; Vreugdenhil et al. 2002, pp. 6, 11, 20-25).

NGO Involvement

In Honduras, several NGOs are participating in the conservation and management of this species such as The Nature Conservancy (TNC) and the Honduran Biodiversity Research Coalition. The Honduran Emerald Reserve was created by the Honduran Government in 2005 with support from TNC. TNC has provided both technical and financial support to the government and local community groups to complete a 10-year management plan for the Reserve. Some aspects of TNC's involvement have included marking the official reserve boundaries and providing training to partners in the management of reserves and protected areas. The Honduran Biodiversity Research Coalition is a group of scientists and conservationists established in 2011 that undertakes and promotes biodiversity research and conservation in Honduras.

Honduran Emerald Reserve

In 2009, the National Conservation and Forestry Institute (ICF) began a management plan for a protected area specifically for the Honduran emerald hummingbird. This was with the participation of municipalities and Arenal Olanchito, the department of Yoro, SOPTRAVI Honduras Armed Forces (HAF), the Ministry of Education through the Regional Environmental Education Center, CREATE, the Ministry of Tourism and the Ministry of Environment and Natural Resources, SERNA (Steiner and Coto 2011; Portillo 2007, p. 99). The Interagency

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Management Area was formed. In 2010, the ICF, with financial support from The Nature Conservancy, finalized the management plan for the protected area (Resolution No. DE-MP-147-2010). This Reserve was established in connection with funding from the World Bank to finish building the main highway linking the capital with Olanchito, Yoro, via Cedros Francisco Morazán (Steiner and Coto 2011) (refer to section on Roads, above).

This reserve is located 34 km (21 mi) west of the city Olanchito in the Aguán Valley (see Figure 1). The reserve encompasses 1,217 ha (3,007 ac) and spans elevations between 220 and 800 meters (722 and 2,625 ft). There are 651 ha (1609 ac) of dry forest habitat remaining that is suitable for the Honduran emerald hummingbird (Perez and Thorn 2012, pers. comm.; Thorn et al. 2000 in Anderson 2010, p. 6). The Honduran Emerald Reserve is guarded by Honduran Air Force soldiers who patrol the reserve and do not allow visitors into the Reserve without prior permission (Hyman 2012b pers. comm.). However, cattle from neighboring land owners are frequently found grazing uncontrolled on the property on the Honduran emerald habitat (Steiner 2011, p. 1; House 2004, p. 30). Despite conservation efforts, land owners around the protected area want to expand their properties and are cutting more of the Honduran emerald hummingbird's suitable habitat in order to plant grass for cattle grazing (Hyman and Steiner 2012 pers. comm.). Because encroachment and livestock grazing continue to occur both around and in the Reserve, and this species requires more suitable habitat than what exists in the Reserve, this protected area is insufficient to provide adequate suitable habitat for this species.

In conclusion, Honduras is improving its management of its resources (FAO 2010). For example, in 2010, Honduras began an initiative to recover degraded areas and denuded forests

(Ecolex 2011). However, most of the habitat required by the Honduran emerald hummingbird is privately owned, and the thorn forests are being converted to other uses that are not suitable for this species. Despite the progress made in Honduras with respect to laws and regulatory mechanisms in place to protect the Honduran emerald hummingbird, the species continues to face habitat loss and degradation.

Finding and Proposed Listing Determination

An assessment of the need for a species' protection under the Act is based on threats to that species and the regulatory mechanisms in place to ameliorate impacts from these threats. As required by section 4(a)(1) of the Act, we conducted a review of the status of this species and assessed the five factors in consideration of whether the Honduran emerald hummingbird is threatened or endangered throughout all of its range. These five factors are:

- (a) The present or threatened destruction, modification, or curtailment of its habitat or range;
- (b) Overutilization for commercial, recreational, scientific, or educational purposes;
- (c) Disease or predation;
- (d) The inadequacy of existing regulatory mechanisms; or
- (e) Other natural or manmade factors affecting its continued existence.

We examined the best scientific and commercial information available regarding the past, present, and future threats faced by the species and consulted with species experts.

We found that habitat loss due to conversion to agriculture and plantations is the main factor affecting this species throughout its range (factor A) (Bonta 2012 pers. comm.; Perez and Thorn 2012 pers. comm.). Hummingbirds require a constant source of energy, primarily in the form of nectar. In order to meet its energy and nutritional requirements, this species needs access to intact, suitable habitat with a diversity of plant species that contain its energy sources throughout the year.

The Honduran emerald hummingbird and its habitat are being affected primarily by the clearing of dry forest for cattle grazing and agricultural development. Habitat degradation and loss continues to occur and affect the species throughout its range. Due to uncontrolled clearing of land to pastures or plantation agriculture, the hummingbird's dry forest habitat is now limited to a few small, isolated "islands" of suitable habitat, which are surrounded by banana plantations or cattle ranches (Perez and Thorn 2012, pers. comm.). The Honduran emerald hummingbirds' current occupied and suitable range has been highly reduced and severely fragmented. This hummingbird species is expending more energy now in order to find food sources to meet its energy needs, and its suitable habitat is becoming more scarce and fragmented, causing these habitat islands to become farther apart.

Historically, the Honduran emerald hummingbird existed in much higher numbers in more continuous, connected habitat. Its suitable habitat is becoming increasingly limited, and its suitable habitat is not likely to expand in the future. Its population is estimated to be between 200 and 1,000 individuals. Lack of a sufficient number of individuals in a local area or a decline in their individual or collective fitness may cause a decline in the population size, despite the

presence of suitable habitat patches. In cases where populations are very small, effects on the species are exacerbated. Any loss of potentially reproducing individuals could have a devastating effect on the ability of the population to increase. The Aguán Valley is currently considered to contain the largest extent of thorn forest. The four largest fragments are between 360 and 476 ha (890 and 1176 ac), for a combined total of 1,704 ha (Anderson 2010, p. 6). However, very recent estimates of the species' actual extent of occurrence is 150 km² (58 mi²), and one of the best patches of optimal Honduran emerald hummingbird habitat, due to its proximity to a nearby town has practically disappeared (Thorn 2012 pers. comm.).

A species may be affected by more than one threat; these factors can act in combination. Changes in Honduras' climate may be acting in combination with other factors to affect this species' habitat. Extreme weather events (an increase in the severity and frequency in hurricanes and increased periods of drought (factor E) may also affect this species' habitat. Both biotic and abiotic ecological interactions influence species distributions (Jankowski et al., 2010; Dunn et al., 2009). Many climate change models do not take into consideration interactions between species because data regarding these interactions are limited. Impacts typically operate synergistically, particularly when populations of a species are decreasing. Initial effects of one threat factor can later exacerbate the effects of other threat factors (Gilpin and Soulé 1986, pp. 25–26). Fragmentation of populations can decrease the fitness and reproductive potential of the species, which exacerbates other threats.

The species' small population size (factor E) combined with its highly restricted and severely fragmented range, increases the species' vulnerability to adverse natural events that

destroy individuals and their habitat. The species' potential exposure to extreme weather events such as hurricanes, extended periods of drought, or flooding, in combination with habitat loss and degradation may add to factors affecting the continued existence of the species throughout its range now and in the future.

In conclusion, we have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats affecting this species. We have identified multiple factors that have interrelated impacts on this species; however the most significant threat is habitat loss and degradation, particularly since it has such a small and fragmented population, and it requires a variety of food sources. As a species' status continues to decline, often as a result of habitat loss or overutilization, the species will become increasingly vulnerable to other impacts. If this trend continues, its ultimate extinction due to one or more stochastic (random or unpredictable) events such as hurricanes, drought, or flooding becomes more likely. The species' small population size, its reproductive and life history traits, combined with its highly restricted and severely fragmented range, increases this species' vulnerability to other threats. These threats occur at a sufficient scale so that they are affecting the status of the species now and will in the future.

Our review of the information pertaining to the five threat factors supports a conclusion that the imminence, intensity, or magnitude of the factors affecting the Honduran emerald hummingbird, most significantly habitat loss, coupled with a small and declining population, place this species at risk of extinction throughout all of its range, such that a listing as endangered is warranted. We do not find that the factors affecting the species are likely to be

sufficiently ameliorated in the foreseeable future. Therefore, on the basis of the best scientific and commercial information, we find that the Honduran emerald hummingbird meets the definition of an “endangered species” under the Act, and we are proposing to list the Honduran emerald hummingbird as endangered throughout its range.

Peer Review

In accordance with our joint policy with the National Marine Fisheries Service, “Notice of Interagency Cooperative Policy for Peer Review in Endangered Species Act Activities,” published in the **Federal Register** on July 1, 1994 (59 FR 34270), we will seek the expert opinions of at least three appropriate independent specialists regarding this proposed rule. The purpose of peer review is to ensure that our final determination is based on scientifically sound data, assumptions, and analyses. We will send copies of this proposed rule to the peer reviewers immediately following publication in the **Federal Register**. We will invite these peer reviewers to comment during the public comment period on our specific assumptions and conclusions regarding the proposal to list the Honduran emerald hummingbird.

We will consider all comments and information we receive during the comment period on this proposed rule during our preparation of a final determination. Accordingly, our final decision may differ from this proposal.

Available Conservation Measures

Conservation measures provided to species listed as endangered or threatened under the Act include recognition, requirements for Federal protection, and prohibitions against certain practices. Recognition through listing results in public awareness, and encourages and results in conservation actions by Federal and State governments, private agencies and interest groups, and individuals.

The ESA and its implementing regulations set forth a series of general prohibitions and exceptions that apply to all endangered and threatened wildlife. These prohibitions, at 50 CFR 17.21 and 17.31, in part, make it illegal for any person subject to the jurisdiction of the United States to “take” (includes harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or to attempt any of these) within the United States or upon the high seas; import or export; deliver, receive, carry, transport, or ship in interstate commerce in the course of commercial activity; or sell or offer for sale in interstate or foreign commerce any endangered wildlife species. It also is illegal to possess, sell, deliver, carry, transport, or ship any such wildlife that has been taken in violation of the ESA. Certain exceptions apply to agents of the Service and State conservation agencies.

Permits may be issued to carry out otherwise prohibited activities involving endangered and threatened wildlife species under certain circumstances. Regulations governing permits for endangered species are codified at 50 CFR 17.22. With regard to endangered wildlife, a permit may be issued for the following purposes: For scientific purposes, to enhance the propagation or survival of the species and for incidental take in connection with otherwise lawful activities.

Clarity of the Rule

We are required by Executive Orders 12866 and 12988 and by the Presidential Memorandum of June 1, 1998, to write all rules in plain language. This means that each rule we publish must:

- (a) Be logically organized;
- (b) Use the active voice to address readers directly;
- (c) Use clear language rather than jargon;
- (d) Be divided into short sections and sentences; and
- (e) Use lists and tables wherever possible.

If you feel that we have not met these requirements, send us comments by one of the methods listed in the ADDRESSES section. To better help us revise the rule, your comments should be as specific as possible. For example, you should tell us the names of the sections or paragraphs that are unclearly written, which sections or sentences are too long, the sections where you feel lists or tables would be useful, etc.

National Environmental Policy Act (NEPA)

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), need not be prepared in connection with regulations adopted under section 4(a) of the Act. We published a notice outlining our reasons for this determination in the

Federal Register on October 25, 1983 (48 FR 49244).

References Cited

A complete list of all references cited in this proposed rule is available on the Internet at <http://www.regulations.gov> or upon request from the Branch of Foreign Species, Endangered Species Program, U.S. Fish and Wildlife Service (see FOR FURTHER INFORMATION CONTACT).

Author(s)

The primary author of this proposed rule is Amy Brisendine, Branch of Foreign Species, Endangered Species Program, U.S. Fish and Wildlife Service.

List of Subjects in 50 CFR Part 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

Proposed Regulation Promulgation

Accordingly, we propose to amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

PART 17—[AMENDED]

1. The authority citation for part 17 continues to read as follows:

Authority: 16 U.S.C. 1361–1407; 16 U.S.C. 1531–1544; 16 U.S.C. 4201–4245; Pub. L. 99–625, 100 Stat. 3500; unless otherwise noted.

2. Amend § 17.11(h) by adding a new entry for “Hummingbird, Honduran emerald” in alphabetical order under BIRDS to the List of Endangered and Threatened Wildlife to read as follows:

§17.11 Endangered and threatened wildlife.

* * * * *

(h) * * *

Species		Historic range	Vertebrate population where endangered or threatened	Status	When listed	Critical habitat	Special rules
Common name	Scientific name						

Birds							

Hummingbird, Honduran emerald	<i>Amazilia luciae</i>	Honduras	Entire	E		NA	NA

* * * * *

Dated: December 14, 2012

__Rowan W. Gould__

Director, U.S. Fish and Wildlife Service

Billing Code 4310-55-P

~~Endangered and Threatened Wildlife and Plants; Listing the Honduran emerald hummingbird~~

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